Summary

The USA Atlantic sea scallop fishery is one of the most important commercial fisheries along the eastern coast of the United States. Total annual USA landings during 1977-1981 from the Georges Bank, Mid-Atlantic, and Gulf of Maine resources attained record levels, averaging 12,800 metric tons of meats, the highest for any five-year period. In 1980 (latest data available), USA scallop landings generated 110.4 million dollars in ex-vessel revenues, an all time record. Despite recent increases in landings and total revenues, analyses of both commercial and research survey data indicate that resource abundance in almost all fishery areas has begun to decline. This report reviews recent fishery and resource conditions within each principal fishery region and provides an evaluation of these conditions relative to historical patterns and likely future events.

Georges Bank

Total international (USA and Canada) commercial landings in 1981 were 16,200 tons, 49% higher than in 1980, and the third highest annual catch ever. USA 1981 landings were 8,200 tons, an increase of 46% from 1980, and the highest yearly harvest in 18 years. Canadian 1981 landings totalled 8,000 tons, 53% greater than in 1980. More than 80% of the combined 1981 catch was derived from the Northern Edge and Peak region of Georges Bank. USA 1981 landings from this region were 4,306 tons, the highest since 1962, and accounted for 62% of the USA Georges Bank landings, nearly twice the proportional representation in the 1980 landings (34.5%). All of the 1981 Canadian catch was taken from the Northern Edge and Peak. Research vessel survey and commercial data indicate that exceptional recruitment of the 1977 year class, localized principally on the Northern Edge region, sustained the 1981 fishery. This year class was heavily exploited upon recruitment as evinced by the rapid rise and decline of commercial catch rates during January-September 1981 and the prevalence of smaller sized scallops throughout this period in both USA and Canadian catch samples. The mean size of scallops sampled in 1981 from USA landings was the smallest in the 1965-1981 time series, implying a significant reduction in cull size in the commercial fishery.

Total effort in the Georges Bank fishery during 1980 was the highest ever. Preliminary effort statistics for 1981 suggest that effort has remained high. Commercial catch per unit of effort (CPUE) of both fleets, however, declined by about 50% between 1977 and 1980; the 1980 USA CPUE index was the third lowest value in 37 years. Both USA and Canadian CPUE declines indicate that, prior to recruitment of the 1977 year class in 1981, resource abundance had sharply diminished as a consequence of high fishing mortality rates. Fishing mortality is thought to have continued at high levels during 1981 in spite of exceptional recruitment from the 1977 cohort.

USA and Canadian research survey total catch per tow indices declined in all areas on Georges Bank between 1980 and 1981. Survey indices from the South Channel and Southeast Part regions of the Bank declined by over 50%; the 1981 total catch per tow value for each of these regions was the lowest in the 1975-1981 time series.

Pre-recruit indices in both areas were also relatively low. On the Northern Edge and Peak, the 1981 survey data indicate that the 1978 year class is above-average in strength and will provide significant recruitment to the Northern Edge fishery in 1982. However, the 1978 cohort is believed to be only half as large as the 1977 year class and hence, under current fishing practices, will not sustain the level of landings supported by the 1977 year class.

Given the disparity in scallop abundance between the Northern Edge region and all other areas on Georges Bank, it is likely that both USA and Canadian fleets will continue to concentrate their fishing activities during 1982 in this area of Georges Bank. Under 1981 culling practices, this would result in meat counts in the 1982 fishery as high as those observed in 1981, although the implementation of a USA sea scallop fishery management plan in May 1982 is aimed at ameliorating this situation by constraining the harvest of small scallops through meat count and shell size restrictions. Continuation of fishing strategies focused upon incoming recruitment will result in losses in both yield per recruit and reproductive potential, increasing the losses associated with growth overfishing and elevating the probability of recruitment overfishing.

Mid-Atlantic

Total commercial 1981 Mid-Atlantic sea scallop landings were 2,100 tons, 59% less than in 1980, and the lowest annual harvest since 1975. Commercial CPUE in 1980 was 34% lower than in 1979, 64% lower than the peak 1977 index, and the third lowest value in the 1965-1980 USA time series. Despite the sequential annual decline in commercial catch rates since 1977, effort in the Mid-Atlantic has continued to increase reaching a record high in 1980. During 1981, Mid-Atlantic catch rates declined further precipitating a transfer of vessel operations to the Georges Bank fishery.

Commercial size frequency sampling data indicate a continued dependence in the fishery on larger-sized scallops (>110 mm shell height), reflecting the lack of any significant recruitment of the magnitude that sustained record landings during 1976-1980. Concomitantly, the extremely low 1981 commercial catch rates suggest that population abundance has substantially been reduced as a result of high fishing mortality rates during the past four years.

Research survey catch per tow indices during 1980 and 1981 exhibited similar trends. In the Delmarva and Virginia-North Carolina regions, survey values have sequentially declined; the 1981 indices for both areas were the lowest in the 1975-1981 time series. Recruitment of the 1977 and 1978 year classes is relatively low in Delmarva and poor off Virginia-North Carolina. No evidence of successful recruitment of the 1979 year class was observed in survey tows in either area. Survey total catch per tow indices in the New York Bight region in 1980 and 1981 were about half of the 1975 index, and among the lowest values in the survey series. Pre-recruit indices in both years suggest low to moderate recruitment from the 1977 and 1978 year classes. Recruitment of the 1979 year class may be better than these preceding cohorts since scallops from this year class were taken in the 1981 survey. Normally, two-year-old scallops are rarely captured with the survey gear.

The absence of significant recent recruitment throughout the Mid-Atlantic area, in conjunction with high effort levels in the Mid-Atlantic fishery, will continue to impede improvement of resource abundance in the near future. Unless reductions in fishing effort are effected, overall scallop abundance is expected to further decline.

Gulf of Maine

Commercial Gulf of Maine sea scallop landings in 1981 were 1,100 tons, 537 tons less than in 1980, but still the second highest annual catch ever. As in 1980, most of the landings (~70%) were derived from offshore, FCZ waters from newly discovered beds. However, landings in 1981 were taken from beds much further northeastward then those exploited in 1980. This shift in areal distribution of landings connotes that fishery mortality in 1980 resulted in a rapid diminution of standing stock biomass in the areas exploited. Commercial effort in 1980 and 1981 attained record levels, primarily due to increased activity by Class 3 and 4 vessels. During 1965-1979, these vessel classes accounted for less than 10% of the annual Gulf of Maine landings; in 1980, however, combined class 3 and 4 landings comprised more than 60% of the annual catch. Preliminary 1981 data suggest a similar pattern as in 1980. Reliance of the Gulf of Maine fishery on offshore populations is a recent phenomenon. Before 1950, all landings were derived from inshore, territorial waters. During 1970-1978, inshore landings accounted for greater than 87% of the Gulf of Maine commercial sea scallop catch.

In 1980, commercial size frequency sampling data indicated that the offshore fishery was sustained primarily by recruitment of the 1975 year class. Although 1981 data show a substantial increase in the average size of scallop landed, it is likely that this increase is apparent rather than real due to low sampling intensity.

USA spring and autumn offshore bottom trawl survey relative abundance indices indicate differential scallop abundance in waters between 30-60 fm and 61-100 fm. In the former depth zone, catch per tow indices have been relatively stable since 1974. The 1980 and 1981 surveys indicate that the 1975 and 1976 year classes dominate the population. Most of the 1980-1981 offshore exploitation is thought to have occurred in depths between 30-60 fm since the 1975 and 1976 year classes were predominant in commercial size frequency samples obtained in these two years.

In the 61-100 fm region, survey catch per tow indices in 1980 and 1981 markedly increased from former years. Survey size frequency data indicate that abundance has improved due to a successful 1974 year class. Recruitment of the 1975 and 1976 year classes also appear to be above average.

Although the long-term productivity of scallop populations in the 61-100 fm region is unknown at present, the extremely high 1980-1981 survey indices suggest that current densities may be sufficient to support development of commercial exploitation. Given that recent offshore landings have been largely supported by one or two year classes, and have been achieved by significant increases in fishing mortality, it appears unlikely that current catch levels can be sustained unless additional high density beds are located.